WHAT IS CLAIMED IS:

1. An electric power steering controller for giving a superimposed reaction force torque in the return direction of a steering wheel, comprising:

a reaction force torque detecting unit for detecting a reaction force torque of a steering system;

a superimposed reaction force torque calculating unit for calculating a superimposed reaction force torque in the return direction of a steering wheel; and

a control unit for controlling said gain such that said superimposed reaction force torque is reduced when said reaction force torque is large and said superimposed reaction force torque is increased when said reaction force is small.

2. An electric power steering controller according to claim 1, further comprising a steering angle sensor for detecting a steering angle representing a rotating angle from a neutral position of a steering wheel,

wherein said reaction force torque detecting unit is a steering shaft reaction force torque sensor for detecting a reaction force torque of a steering system,

said superimposed reaction force torque calculating unit multiplies a steering angle detected by said steering angle sensor by a gain to calculate a superimposed reaction force torque in the return direction of said steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when a reaction force torque of said steering system is large and said superimposed reaction force torque is increased when a reaction force torque of said steering system is small.

3. An electric power steering controller according to claim 1, further comprising a steering angle sensor for detecting a steering angle representing a rotating angle from a neutral position of a steering wheel,

wherein said reaction force torque detecting unit is a road surface reaction force torque detecting unit for detecting a reaction force torque of a road surface on which a vehicle runs,

said superimposed reaction force torque calculating unit multiplies a steering angle detected by said steering angle sensor by a gain to calculate a superimposed reaction force torque in the return direction of said steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when said road surface reaction force torque is large and said superimposed reaction force torque is increased when said road surface reaction force torque is small.

4. An electric power steering controller according to claim 1, further comprising a road surface reaction force torque detecting unit for detecting a reaction force torque of a road surface on which a vehicle runs,

wherein said reaction force torque detecting unit is a steering shaft reaction force torque sensor for detecting a reaction force torque of a steering system,

said superimposed reaction force torque calculating unit multiplies a road surface reaction force torque detected by said road surface reaction force torque detecting unit by a gain to calculate a superimposed reaction force torque in the return direction of a steering wheel, and

said control unit controls said gain such that said superimposed reaction force

torque is reduced when a reaction force torque of said steering system is large and said superimposed reaction force torque is increased when a reaction force torque of said steering system is small.

5. An electric power steering controller according to claim 1,

wherein said reaction force detecting unit is a road surface reaction force torque detecting unit for detecting a reaction force torque of a road surface on which a vehicle runs,

said superimposed reaction force torque calculating unit multiplies a road surface reaction force torque detected by said road surface reaction force torque detecting unit by a gain to calculate a superimposed reaction force torque in the return direction of a steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when said road surface reaction force torque is large and said superimposed reaction force torque is increased when said road surface reaction force torque is small.

6. An electric power steering controller according to claim 1, further comprising a quantity of state sensor for detecting a quantity of state of any one of a yaw rate, a lateral acceleration and a side slip angle of a vehicle,

wherein said reaction force torque detecting unit is a steering shaft reaction force torque sensor for detecting a reaction force torque of a steering system,

said superimposed reaction force torque calculating unit multiplies a quantity of state of any one of a yaw rate, a lateral acceleration and a side slip angle of a

vehicle detected by said quantity of state sensor by a gain to calculate a superimposed reaction force torque in the retum direction of a steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when a reaction force torque of said steering system is large and said superimposed reaction force torque is increased when a reaction force of said steering system is small.

7 An electric power steering controller according to claim 1, further comprising a quantity of state sensor for detecting a quantity of state of any one of a yaw rate, a lateral acceleration and a side slip angle of a vehicle,

wherein said reaction force torque detecting unit is a road surface reaction force torque detecting unit for detecting a reaction force torque of a road surface on which a vehicle runs,

said superimposed reaction force torque calculating unit multiplies a quantity of state of any one of a yaw rate, a lateral acceleration and a side slip angle of a vehicle detected by said quantity of state sensor by a gain to calculate a superimposed reaction force torque in the return direction of a steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when said road surface reaction force torque is large and said superimposed reaction force torque is increased when said road surface reaction force torque is small.

8. An electric power steering controller according to claim 1, further comprising:

a steering angle sensor for detecting a steering angle representing a rotating angle from a neutral position of a steering wheel;

a motor current detector for detecting a motor current to be supplied to an electric motor for power steering connected to a steering system; and

a steering torque sensor for detecting a torque at the time when a vehicle operator operates a steering wheel,

wherein said reaction force torque detecting unit consists of a steering shaft reaction force torque calculating unit for estimating a reaction force torque of a steering system from a motor current detected by said motor current detector and a steering torque detected by said steering torque sensor,

said superimposed reaction force torque calculating unit multiplies a steering angle detected by said steering angle sensor by a gain to calculate a superimposed reaction force torque in the return direction of a steering wheel, and

said control unit controls said gain such that said superimposed reaction force torque is reduced when a reaction force torque of said steering system is large and said superimposed reaction force torque is increased when a reaction force torque of said steering system is small

9. An electric power steering controller according to claim 8, wherein a reaction force torque Ttran of said steering system is calculated by the following expression:

$Ttran = Thdl + Tassist - J\,dw/dt$

where Thdl is a steering torque, Tassist is an assist torque by a motor and $J \cdot dw/dt$ is an inertia torque of the motor

10. An electric power steering controller according to claim 3,

wherein said road surface reaction force torque is calculated by subtracting a friction torque of said steering system from a reaction force torque of said steering system.